

Docket No.: 4661-0108PUS1
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Banwari LAL et al.

Application No.: 10/564,365

Confirmation No.: 9223

Filed: June 2, 2006

Art Unit: 3676

For: A PROCESS FOR ENHANCED RECOVERY
OF CRUDE OIL FROM OIL WELLS USING
NOVEL MICROBIAL CONSORTIUM

Examiner: BATES, Z.W.

STATEMENT OF THE INTERVIEW

MS Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Applicants thank the Examiner for the phone call on August 6, 2008 and the second call on or around August 8, 2008. Applicants write to provide a summary of the interview.

The Examiner indicated that she wishes for Applicants to cancel claims 37 and 38, as they have been rejected by the Quality Assurance section. The Examiner indicated that the Quality Assurance section asserts that claims 37 and 38 are each distinct from the subject matter of claims 20-36. Applicants replied, and herein reiterate, that the present application is a national stage application of PCT/IN/2004/000206, and that there has been no prior art presented that destroys the inventiveness of the consortium MTCC S2-2001. Therefore, Applicants submit that under the applicable Unity of Invention standard, there is a special technical feature that unites the claims. Thus, Applicants submit that dividing the claims is a post hoc, improper imposition of a Restriction Requirement.

Furthermore, restriction is an option of the *Examiner*, who has chosen to examine all of the claims already. Still further, MPEP 821.04 provides that method claims, commensurate in scope with allowable composition claims, should be rejoined for examination. In this instance, the composition (MTCC S2-001) and method of use claims *are* commensurate in scope as all of the method claims include use of the composition. For example, claim 38 recites steps (d) and (e) of claim 20, thus is not distinct from claim 20.

The Examiner also indicated that the Quality Assurance section intends to reject claim 37 under 35 U.S.C. §101, as the claim does not “reflect the hand of man.” Applicants herein explain the nature of the deposited consortium, and how this reflects “the hand of man.”

The microbial consortium has three strains which are related to the genus *Thermococcus*, *Thermotogo* and *Thermoanaerobacterium*. (Page 19, Lines 27-28)

The specification clearly supports the role of human intervention in obtaining the microbial consortium. The following points from the specification support the involvement of a human hand.

Isolation of Microbial Consortium: The Specification recites at page 11-12: under the heading- Development of thermophilic barophilic, anaerobic microbial consortium for microbial enhanced oil recovery:

The oil well formation fluid samples for the development of anaerobic, thermophilic, halophilic and barophilic consortium are collected from selected oil wells, from Mehasana Region of Gujarat, India. The formation fluid samples are collected under strict anaerobic conditions following the standard anaerobic sample collection techniques known to the people skilled in the art. For initial observation of microbial populations in the formation fluid, the microorganisms are preferably concentrated by filtration, centrifugation and microscopic observation. The biomass of the indigenous microbial population will typically be a very small fraction of the formation fluid sample's volume. Alternatively, the indigenous microorganisms can be first cultured in the laboratory using

techniques familiar to those skilled in the art and then concentrated and collected. Microorganisms' population is amplified to facilitate detection using conventional microbial detection techniques, which are familiar to those skilled in the art.

The formation fluid samples are obtained by sampling procedures that are known to those skilled in the art. Normally, a formation fluid sample is retrieved from the oil formation through a well casing or from an open-hole test. Samples from the formation fluid of the selected oil wells whose temperatures are in the range of 70°C to 90°C are collected in five litre carboys after flushing the empty carboy with the natural gas from the oil well or nitrogen gas using a portable nitrogen cylinder. To lower the redox potential and to maintain anaerobiosis reducing agents @ 0.5g/L cysteine.HCl and 0.5 g/L $\text{Na}_2\text{S}_9\text{H}_2\text{O}$ are added to the sample collected in carboys. The formation fluid samples are used as seed inoculum @ 10% v/v for on the spot inoculation into 100 ml anaerobic serum vials containing the specifically designed anaerobic nutrient medium using a sterile gas tight 10 ml glass syringe. The oil formation fluid samples and the inoculated 100 ml anaerobic serum vials with the said medium are constantly maintained at high temperature in an insulated box during transportation to the lab for processing and are incubated at the desired temperatures (70, 80, 85 and 90°C) for enrichment and further screening for selecting the most efficient consortium.

Enrichment of Microbial Consortium: The Specification states at page 13: under the heading- Enrichment of the thermophilic, barophilic anaerobic microbial consortium:

..... All the formation fluid samples collected from the selected oil wells for enrichment and development of anaerobic consortia at high temperature and further screening for selecting the most efficient consortia are incubated at different temperatures viz., 70, 80, 85, and 90°C. These formation fluid samples from different selected oil well are maintained in the laboratory under strict anaerobiosis using prescribes standard anaerobic techniques known to the people skilled in the art. The samples are constantly maintained at desired high temperatures in incubators for use as seed inoculum during the process of adaptation and enrichment for the subsequent transfers into fresh medium.

Adaptation of Microbial Consortium: At page 16, under the heading- Adaptation of microbes to higher temperatures, the Specification states:

Specifically designed anaerobic nutrient medium is used for adaptation of isolated microorganisms for higher temperatures. Incubations were carried out at different temperatures (75°C to 95°C). through adaptation processes, which makes it possible to adapt microorganisms to different temperatures, the three different consortia MEOR-TERI A, MEOR-TERI B and MEOR-TERI C were developed and the consortium MEOR-TERI B was found to have the three different isolates which later are related to viz., *Thermococcus* sp., *Thermotoga* sp., and *Thermoanaerobacterium* sp., and deposited as a consortium with IMTECH, Chandigarh, India with the Accession Number MTCC-S2-001.

Characterization of Microbial Consortium: At page 18: under the heading- Characterization of the selected thermophilic, barophilic anaerobic consortium with accession no. MTCC S2-001, the Specification states:

The enriched consortium with accession no MTCC S2-001 is purified using serial dilution method known to the people skilled in the art, with the specifically designed anaerobic nutrient medium. The serial dilutions are made to 10^7 . An aliquot of 100 microlitres is taken from each dilution of 10^4 10^5 10^6 and 10^7 and inoculated into Hungate's roll tubes containing 5 ml of specifically designed anaerobic nutrient medium with gelrite gellan as the gelling agent kept at 65°C in a water bath. Immediately after inoculating the tubes are rolled on ice in a tray and the gelrite medium gets solidified evenly on the inner walls of the Hungate's roll tubes. The roll tubes are incubated at 90°C for 15 days. After 15 days the bacterial colonies formed are picked and inoculated into fresh specifically designed anaerobic nutrient medium. After growing the selected colonies on the specifically designed anaerobic nutrient medium the cultures were analysed for purity, and morphological characters. After detailed observations three different species were found with different morphological characters in the selected thermophilic, barophilic anaerobic consortium with the accession no MTCC S2-001. The

results of the morphological characterization of MTCC-S2 consortium are shown in Table 1. The microscopic observation of the cultures growing on the specifically designed anaerobic nutrient medium in the 100 ml anaerobic serum vials is shown in Table 1.

The growth on different substrates and observed metabolites formed are shown in Table 2., The antibiotic sensitivity profiling of the three isolates of the consortium with accession no. MTCC S2-001 is shown in Table 3. The growth on different media for the strains present in the microbial consortium is shown in Table 4.

Applicants point the Examiner to Tables 1-4 for further detail on the characteristics of the isolated, concentrated, purified, enriched and adapted bacteria.

Therefore it can be deduced from the specification that the microbial consortium is a biologically pure form of three bacterial strains related to the genus *Thermococcus*, *Thermotogo* and *Thermoanaerobacterium*, which involves distinct human intervention of isolating the 3 strains in a purified, concentrated enriched and adapted form out of the microbial consortium collected from oil wells. Furthermore, the microbial consortium is characterized for the confirmation of characteristics and biological purity of the microbial consortium.

Thus Applicants submit that the present invention falls within the categories of statutory subject matter described in §101. Applicants note that this rejection has not yet been imposed, however, hope that these remarks clarify the subject matter of the Applicants' invention such that a §101 rejection is not imposed in the future.


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No fees are required for this submission.

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Respectfully submitted,

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